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EXAMINER	
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2837	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/579,282	FRITZE ET AL.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27-31* is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/15/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The second paragraph of 35 U.S.C. 112, requires a claim to point out and distinctly claim the subject matter which applicant regards as his invention. Under *In re Hammack*, 166 USPQ 204 (CCPA 1970) and *In re Moore*, 169 USPQ 236 (CCPA 1971), claims must be analyzed to determine their metes and bounds so that it is clear from the claim language what subject matter the claims encompass. The definiteness of the claims is important to allow others who wish to enter the market place to ascertain the boundaries of protecti9on that are provided by the claims. *Ex parte Kristensen*, 100 USPQ 2d, 1701 (PTO Bd. Pat. App. & Intf. 1989). Use of a narrower range within a broader range in the same claim renders the claim indefinite since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. One could not tell from such a claim if the narrower range or limitation is a restriction of limitation on the broader range of limitation. In this instance the broader range is the 'signals' and the narrower range is defined by the word 'particularly'. The use of 'particularly' is not indefinite per se, but the use of this term to link broad and narrow limitations renders the claim indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Josse, et al. (US 5,852,229). Josse, et al. show (figs. 1a-1c, 10-12) a device for detecting an environmental influence (see ABSTRACT and col. 8, lines 1-23) onto a sensor (10), by means of detecting a change in an electrical conductivity of a sensor layer (25, see col. 8, lines 32-41) of the sensor (10) , wherein the sensor (10) has a first (20) and a second (30) excitation electrode, a piezoelectric material (15), and a sensor layer (25), which comprises: an excitation unit (100) for generating electrical potentials, which are passed to the piezoelectric material (15) by way of the first (20) and the second (30) excitation electrode, whereby the sensor layer (25) lies against both at least one excitation electrode (20) and the piezoelectric material (15), at least in sections, and the sensor layer (25) has a conductivity that is dependent on environmental influences (again see col. 8, lines 32-41), so that the piezoelectric material (15) can be excited to vibrate by means of the excitation electrodes (20, 30) and the sensor layer (25), wherein a frequency measurement device (110, 115) makes it possible to detect a vibration order of the piezoelectric material (15). See col. 16, lines 53-62 where it is noted that "critical frequencies" are noted.

In re claim 2: The excitation unit (100) is formed by means of an oscillation circuit or a network.

In re claim 3: The excitation electrode (both 20 and 30) is formed from a metal, a non-oxide ceramic, oxide ceramic, or a precious metal (not col. 4, lines 23-27 where use of gold or silver is noted).

In re claim 4: The excitation electrode (both 20 and 30) lies directly against the piezoelectric material (15).

In re claim 6: The first excitation electrode (20) lies against the piezoelectric material (15) with an area that is larger than or **smaller** than an area with which the second excitation electrode (30) lies against the piezoelectric material (15).

In re claim 7: The excitation electrode(s) (20, 30) lie against the piezoelectric material with a circular area.

In re claim 8: The first excitation electrode (20) has a same geometry as the second excitation electrode (30). Both show a circular geometry.

In re claim 9: The piezoelectric material (15) is formed from a **quartz**, from langasite, its isomorphous compounds, or from gallium orthophosphate, or is a piezoelectric material that is capable of functioning even at temperatures up to 1000^0C.

In re claim 10: the piezoelectric material (15) has the basic shape of a cylinder. Note that figure 1b is similar to that of the Applicants figures 1a, 1b, 3 and 4, which are the figures showing the shape of the piezoelectric material.

In re claim 11: The sensor layer (25) lies directly against the at least one excitation electrode (20) and/or the piezoelectric material (15).

In re claim 12: The sensor layer (25) is configured in circular shape. See figure 14 which shows the configuration of the sensor layer.

In re claim 13: The sensor layer (25) contains oxide ceramics, non- oxide ceramics, semiconductors, **organic synthetic or natural polymers**, ZnO, ZnS, Ti02, Se, Ce02, oxides of transition metals, proteins or nucleic acids. See col. 8, lines 24-56.

In re claim 14: The frequency measurement device (110) comprises a frequency counter. See column 15, lines 58-60 where this is noted.

In re claim 15: The vibration order is the first, third, fifth, or higher. See claim 1 of Jones et al. where it is noted that the means for sensing the frequency involves "sensing at least one resonant frequency" which explicitly includes at least the first, and implicitly includes the third, fifth or higher resonant frequencies.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Josse, et al. (US 5,852,229) in view of Josse's, et al. prior art figure 4 of the same patent document. In their invention, Josse, et al. show the first excitation electrode (20) lying against the piezoelectric material (15) but

not with an area that is as large as an area with which the second excitation electrode (30) lies against the piezoelectric material.

They don't show electrodes with the areal arrangement claimed in their invention.

Josse, et al. prior art figure 4 shows the first excitation electrode (labeled upper electrode) lying against the piezoelectric material (labeled quartz) with an area that is as large as an area with which the second excitation electrode (labeled lower electrode) which lies against the piezoelectric material. Note at col. 6, lines 21-22 that figure 4 shows a device "with equal circular electrodes".

The prior art figure 4 does not show the sensor layer.

It would have been obvious to one having ordinary skill in the art to employ a sensor layer such as is shown by Jones et al. fig. 1 in their fig. 4 so that the device can be used as sensor device which is the purpose of their invention.

Additionally, at col. 9, lines 12-18, Jones, et al. note that with a "polymeric layer", the figure 4 invention's equipotential field lines, specifically "surface fringing fields are insignificant". Thus the claim 5 invention of the Applicants is anticipated.

Claims 16, 17, 19, 20, 21 (as best understood) are rejected under 35 U.S.C. 103(a) as obvious over Josse, et al. (US 5, 852,229). Jones et al. note (see claims 20-29) a method for detecting an environmental influence (15) on a sensor by means of detecting a change in the electrical conductivity of a sensor layer (3) of the sensor, using a device according to claim 1 (as noted above), which comprises the following steps: 1. Generating a fundamental tone in a piezoelectric material (15, implicit in step 3 of claim 20); 2. Measuring the resonance frequency of the vibration order of step 1,

(explicit in step 3 of claim 20); 3. Exerting an environmental influence (see second paragraph of step) on the sensor layer (25), causing the conductivity (as noted above) of the sensor layer (25) to be changed and thereby causing the frequency spectrum of the piezoelectric material (15) to be changed; 4. Measuring the vibration order after exertion of the environmental influence (again see last paragraph section e of claim 1); 5. Calculating a resonance frequency difference that is formed from the difference of the resonance frequency of the vibration order of step 1 and the resonance frequency of the vibration order after changing the environmental influence, (again see the last paragraph of section e of claim 1); and, step 6. Correlating the extent of the environmental influence with the resonance frequency difference. Note at col. 4, lines 48-65 that different resonant and anti-resonant frequencies are stored frequencies in a band containing the respective resonant and anti-resonant values. When the sensed frequency matches one of the stored frequencies, the analyte is known.

In re claim 17: as noted above in the rejection of claim 15, harmonics are also generated and measured in the piezoelectric material, which are also taken into consideration in detecting the type or the extent of the environmental influence.

In re claim 19: exerting an environmental influence comprises irradiation of the sensor layer (25) with high-energy radiation. Note at col. 4 line 4 that the analyte "means an atom, ion …". Citation of an ion indicates irradiation, and note too that there is no limit applied to the energy level of the radiation.

In re claim 20: the environmental influence is the effect of a chemical or biological substance on the sensor layer (25), or a temperature change. See col. 8, lines

1-23.

In re claim 21, as best understood: signals that run periodically, particularly rectangular, sine, or triangular signals, are passed to the piezoelectric material by the excitation unit (100). Note that Josse, et al. do not limit their oscillator to any particular shape of signal, ergo, the frequencies provided, cover at a minimum a sine wave.

Josse, et al. do not note the same sequence of steps as the Applicants do. It would have been obvious to employ the steps of Jones et al. in place of the claimed methodology since both methods cite similar features and similar results and since the Josse, et al. invention precedes that of the Applicants, therefore providing a known methodology for the same purpose and involving the same necessary steps.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Josse, et al. (US 5,852,229). It is not noted by Josse, et al. that the resonance frequencies of the upper harmonics serve for a temperature compensation of the vibration behavior of the piezoelectric material. Note however that this is not a step and therefore not clearly further limiting to the methodology claimed. As Josse, et al. could make that use of their stored frequencies, this is therefore met by them.

Claims 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Josse, et al. (US 5,852,229). In re claim 22: Josse, et al. show (figs. 1a-1c, 10-12): an arrangement (e.g. 109 in Fig. 11) of a first sensor (105) and a second sensor (107) for detecting an environmental influence (see col. 8, lines 1-23), whereby the first sensor (105) has a first (reference figures 1a-1c, 20) and an opposite second (30) excitation electrode, a piezoelectric material (15) disposed between these, and a sensor layer (25)

that covers the first excitation electrode (20) and also the piezoelectric material (15) at least in sections, and the sensor layer (25) has a conductivity that is dependent on environmental influences (as noted above in rejection of claim 1) so that the piezoelectric material (15) can be excited to vibrate by means of electrical potentials from the excitation unit (100) for generating electrical potentials, both by way of the excitation electrodes (20, 30) and by the sensor layer (25), and the resonance frequency of a vibration order of the piezoelectric material (15) can be detected by means of a frequency measurement device (110, 115), and the second sensor (107) has a first (20) and an opposite second (30) excitation electrode, a piezoelectric material (15) disposed between these, and a sensor laver (25) that covers the excitation electrode (20) at least in sections, and the sensor layer (25) has a conductivity that is dependent on environmental influences (as noted in the rejection of claim 1 above), wherein the sensor layer (25) is disposed in such a manner that the piezoelectric material (15) can be excited to vibrate exclusively by means of the excitation electrodes (20, 30), and the resonance frequency of a vibration order of the piezoelectric material can be detected by means of a frequency measurement device (110, 115).

In re claim 23: the piezoelectric material (15) in the first sensor (105) is identical with that of the second sensor (107). Note that Jones et al. do not note any difference between 105 and 107.

In re claim 24: the materials of which the excitation electrodes of the first and second sensor (105, 107) consist are identical. Again note that no difference between the sensor units is noted.

In re claim 25: The material of which the sensor layer (25) of the first sensor (105) is formed is identical with the second material of which the sensor layer (25) of the second sensor (107) is formed. Again note that no difference is noted by Josse, et al.

In re claim 26: The geometry in which the sensor layer (25) of the first sensor (105) is shaped is identical with the geometry in which the sensor layer (25) of the second sensor (107) is shaped. Again note that while Josse, et al. show different embodiment shapes, they note such differences in their figure 11 and 12 embodiments.

Josse, et al. do not show their sensor layer covering their excitation electrode at least in sections that does not exceed it.

It would have been obvious to one having ordinary skill in the art to have a sensor layer covering the excitiaton electrode at least in sections that does not exceed the excitation electrode since it has been held that such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Allowable Subject Matter

Claims 27-31 are allowed.

The following is an examiner's statement of reasons for allowance: while the prior art shows a sensor device for detecting an environmental influence, having a first and a second excitation electrode, a piezoelectric material disposed between these, and a sensor layer, wherein the first excitation electrode is disposed on a first side of the piezoelectric material, and the second excitation electrode is disposed on the opposite,

second side of the piezoelectric material, and the sensor layer lies against the first excitation electrode with a first partial area AI, and against the piezoelectric material with a second partial area A2, and the sensor layer has a conductivity that is dependent on environmental influences, so that the piezoelectric material can be excited to vibrate by means of electrical potentials from an excitation unit for generating electrical potentials, both by way of the excitation electrodes and by the sensor layer, and the resonance frequency of a vibration order of the piezoelectric material can be detected by means of a frequency measurement device, **said prior art does not further show, singly or in combination, a third excitation electrode disposed on the second side of the piezoelectric material, which lies against the piezoelectric material with an area A3, which is at least as large as the partial area A2 of the sensor layer and, if this partial area is projected onto the area A3, the partial area A2 is completely covered by the area A3,, and the first, second, and third excitation electrode are electrically connected with a switching means that connects the second and third excitation electrode in electrically conductive manner in a first switching position, so that the conductivity of the sensor layer can be detected, and the switching means connects the first and third excitation electrode in electrically conductive manner in a second switching position, so that the change in the vibration properties caused by deposit of substance of the environmental influence can be measured.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on at least some aspects of the claimed invention.

/tmd/ /Thomas M. Dougherty/

tmd Primary Examiner, Art Unit 2837

October 6, 2009